## CLAIMS:

- 1. An optical coherence tomography system comprising
- an optical source to emit an optical beam
- a sample space
- a photodetector

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- 5 an interferometer set-up including
  - a reference reflector and
  - a beam splitter-combination arrangement to
    - split the optical beam into a reference beam to the reference reflector and a sample beam to the sample space and to
    - combine a reflected beam from the reference reflector with a returning beam from the sample space on the photodetector, wherein
  - the optical source has an emission wavelength in the range of 1.6μm to 2.0μm, in particular having an infrared emission predominantly at a wavelength of 1.8μm associated with a transition between an upper energy level and a lower energy level and
  - the optical source comprises an excitation system which generates stimulated emission from a pump level to the upper energy level.
- An optical coherence tomography system as claimed in Claim 1, wherein the
  optical source includes a Tm-doped fibre placed in an optical cavity of cavity reflectors facing one another.
  - 3. An optical coherence tomography system as claimed in Claim 2, wherein the cavity reflectors are anti-reflex coated for a wavelength range of 760nm to 810nm.
  - 4. An optical coherence tomography system as claimed in Claim 2 or 3, wherein the cavity reflectors have a high-reflectivity (coating) for the wavelength range 2.2μm to 2.4μm.

- 5. An optical coherence tomography system as claimed in Claim 2,3 or 4 wherein the cavity reflectors have a high-reflectivity (coating) for the wavelength range  $2.2\mu m$  to  $2.4\mu m$  and/or for the wavelength range  $1.40\mu m$  to  $1.5\mu m$ .
- 5 6. An optical coherence tomography system as claimed in Claim 2, wherein the optical cavity has reflectivities less than 0.04 for the wavelength range of 1.6-2.0μm.
  - 7. An optical coherence tomography system as claimed in Claim 6, wherein
- an input cavity reflector has a high reflectivity (coating) for the wavelength range 1.6μm
  to 2.0μm and
  - an output cavity reflector has a low-reflectivity (coating) for the wavelength range 1.6μm to 2.0μm.
  - 8. An optical amplifier comprising
- 15 a Tm-doped fibre in an optical cavity of cavity reflectors facing one another, wherein
  - the cavity reflectors have an antireflex coating for the wavelength range of 1.6μm
    to2.0μm, and in particular are anti-reflex coated for a wavelength of 1.8μm.
- 9. A Tm-doped fibre having a fibre core extending along a longitudinal axis of the fibre and having a double cladding surrounding the fibre core.